

**BASIS FOR THE AMENDMENT**

Claim 2 has been amended as supported by the original claims and the specification. Consequently Claims 10 and 12 have been canceled.

New Claim 15 has been added as supported at page 3, lines 12-26 of the specification.

New Claim 16 has been added as supported by Claim 1 as originally filed.

No new matter is believed to have been added by entry of this amendment. Entry and favorable reconsideration are respectfully requested.

Upon entry of this amendment Claims 1, 2, 4-7 and 11, 13-16 will now be active in this application.

**REMARKS**

Applicants respectfully request reconsideration of the application, as amended, in view of the following remarks.

The rejection of Claim 2 under 35 U.S.C. § 112, 1<sup>st</sup> paragraph, is obviated by the amendment of Claim 2.

The rejection of Claims 10 and 12 is moot in view of the cancellation of Claims 10 and 12.

**SUMMARY OF CLAIMED SUBJECT MATTER**

As claimed in **Claim 1**, the present application relates to a moulding, comprising:  
a **plastic matrix** which comprises a **transparent plastic**,  
a **soluble fluorescent dye**,  
a **scattering agent** whose refractive-index difference from said plastic matrix is  
+/- from 0.003 to 0.2, and  
0.001 to 0.1% by weight of a **white pigment** whose refractive-index difference from  
said plastic matrix is from +0.4 to 1.5; and  
**wherein said scattering agent is one or more materials selected from the group  
consisting of barium sulphate, polystyrene, light-scattering beads comprising  
crosslinked plastic and mixtures thereof.**

GROUND OF REJECTION

(A) Claims 1, 4-7, 11, 13-14 stand rejected as being obvious under 35 U.S.C. §103 (a) over JP 06-67612.

ARGUMENT

Ground (A)

Claims 1, 4-7, 11, 13-14 stand rejected as being obvious under 35 U.S.C. §103 (a) over JP 06-67612. That rejection is untenable and should not be sustained.

The present application describes a molding based on **a combination of three elements: a fluorescent dye, a scattering agent and a white pigment**. The combination of the three elements shows **synergetic effects** as can be seen from the examples, e.g. **enhancement of the brilliance of colors** of molding compositions. **Only very small amounts of white pigment give marked increase in color brightness.**

The specification discloses in the paragraph bridging pages 1 and 2:

Surprisingly, the effect of addition of the white pigment at an unusually low concentration is a marked rise in colour brightness. The mouldings of the invention in particular have a reflectance which, measured in % using a spectrophotometer to DIN 5036, is higher by at least 10% than that of a corresponding moulding without white pigment. This rise in brightness in colour is clearly discernible, even by the naked eye.

The present application is concerned with the problem of providing a moulding with improved brightness of color. The examples in the specification, which use the claimed combination of a fluorescent dye (see Table 1 at page 7 of the specification), a scattering agent (BaSO<sub>4</sub>) and a white pigment (TiO<sub>2</sub> or ZnS), show clearly that the problem is indeed solved. The improved brightness of color can be observed under daylight conditions D65 (incident light condition) already from visual assessment for all colors in comparison to the

mouldings without addition of whitening pigments. The red colored mouldings show increased L\*- and a\*-values standing for increased brightness and increased red-values. The mouldings colored orange, yellowish green and yellow show even more increased L\*-, a\*- and b\*-values with reflectance-values that are more than 10% increased in comparison to the mouldings without addition of whitening pigments.

Table 2 at page 8 of the specification shows various examples and comparative examples. Examples according to the present invention are marked in **bold letters and use barium sulphate and titanium dioxide (Example No. 144 E uses barium sulphate and zinc sulphide)**. For the composition see Table 1 at page 7 of the specification.

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Results:

Tab. 2 CIELAB reflection colour values L, a, b for D65/10° illuminant

Exp. No.	Shade	L*	a*	b*	Reflectance in %	Visual assessment in D65 daylight
113T	orange	56.29	23.66	94.86	24.2	yellowish-orange fluorescence, somewhat cloudy
144M	orange	66.10	29.80	105.55	35.5	yellowish-orange fluorescence, very bright
113Q	yellowish green	62.34	-31.70	80.00	30.8	yellow fluorescence, somewhat cloudy
144K	yellowish green	70.53	-31.21	90.56	41.5	yellow fluorescence, very bright
113S	red	34.77	60.93	59.94	8.4	red fluorescence, somewhat cloudy
144E	red	37.81	65.73	59.53	10.0	red fluorescence, very bright
144G	red	37.40	64.83	58.77	9.8	red fluorescence, very bright
148A	yellow	64.40	-30.14	90.36	33.3	yellow fluorescence, somewhat cloudy
148F	yellow	72.31	-28.77	99.64	44.1	yellow fluorescence, very bright

The specification discloses at page 9, 1<sup>st</sup> paragraph:

As can be seen from the colour values, and also from visual assessment, the products produced using the barium sulphate/titanium dioxide (zinc sulphide) combination have markedly greater brightness of shade. Red has a higher red value, yellow has a higher yellow value, etc. The improvement is also clearly detectable visually.

Further, a **Rule 132 Declaration** submitted January 23, 2008, shows **examples according to the present invention accented in bold letters**. Comparative examples are shown in regular (not bold) font.

**Tables 1, 2 and 3** show the amounts of the components used in the respective examples and Comparative examples.

**Tables 4, 5 and 6** show the test results for Hue, L\*, a\*, b\*, Luminosity coefficient and Visual evaluation in D65 daylight.

**The values should be compared only within one set of coloring**. The comparison should be made within the following sets which are listed in order in the Tables.

**Table 1 and 4:**

- 113T (comparative) and **144M (according to invention);**
- 113Q (comparative) and **144K (according to invention);**
- 113S (comparative) and **144G (according to invention);**
- 148A (comparative) and **148F (according to invention);**
- 780/I/1 (comparative), **780/I/2 (according to invention), 780/I/3 (according to invention), 780/I/4 (comparative);**
- 780/I/5 (comparative), **780/I/6 (according to invention), 780/I/7 (according to invention), 780/I/8 (comparative);**
- 780/I/9 (comparative), **780/I/10 (according to invention), 780/I/11 (according to invention), 780/I/12 (comparative);**

-780/I/13 (comparative), **780/I/14 (according to invention)**, **780/I/15 (according to invention)**, 780/I/16 (comparative).

**Tables 2 and 5:**

-780/II/1 (according to invention) and 780/II/5(comparative);

-780/II/2 (according to invention) and 780/II/6 (comparative);

-780/II/3 (according to invention) and 780/II/7 (comparative);

-780/II/4 (according to invention) and 780/II/8 (comparative).

**Tables 3 and 6:**

-780/III/1 (according to invention) and 780/III/5(comparative);

-780/III/2 (according to invention) and 780/III/6 (comparative);

-780/III/3 (according to invention) and 780/III/7 (comparative);

-780/III/4 (according to invention) and 780/III/8 (comparative).

**Table 1**

Test No.	White pigment, titanium dioxide %	Scattering agent, barium sulfate %	Lumogen F Orange 240 %	Lumogen F Yellow 083 %	Lumogen F Red 305 %	Hostasol yellow 3G %
113T	----	1.0	0.05			
<b>144M</b>	<b>0.0075</b>	<b>1.0</b>	<b>0.05</b>			
113Q	----	1.0		0.05		
<b>144K</b>	<b>0.0075</b>	<b>1.0</b>		<b>0.05</b>		
113S	----	1.0			0.05	
<b>144G</b>	<b>0.0075</b>	<b>1.0</b>			<b>0.05</b>	
148A	----	1.0				0.05
<b>148F</b>	<b>0.0075</b>	<b>1.0</b>				<b>0.05</b>
780/I/1	0.0005	1.0	0.05			
<b>780/I/2</b>	<b>0.0015</b>	<b>1.0</b>	<b>0.05</b>			
<b>780/I/3</b>	<b>0.075</b>	<b>1.0</b>	<b>0.05</b>			

780/I/4	0.15	1.0	0.05			
780/I/5	0.0005	1.0		0.05		
<b>780/I/6</b>	<b>0.0015</b>	<b>1.0</b>		<b>0.05</b>		
<b>780/I/7</b>	<b>0.075</b>	<b>1.0</b>		<b>0.05</b>		
780/I/8	0.15	1.0		0.05		
780/I/9	0.0005	1.0			0.05	
<b>780/I/10</b>	<b>0.0015</b>	<b>1.0</b>			<b>0.05</b>	
<b>780/I/11</b>	<b>0.075</b>	<b>1.0</b>			<b>0.05</b>	
780/I/12	0.15	1.0			0.05	
780/I/13	0.0005	1.0				0.05
<b>780/I/14</b>	<b>0.0015</b>	<b>1.0</b>				<b>0.05</b>
<b>780/I/15</b>	<b>0.075</b>	<b>1.0</b>				<b>0.05</b>
780/I/16	0.15	1.0				0.05

**Table 2**

<b>Test No.</b>	<b>White pigment, titanium dioxide %</b>	<b>Scattering agent, SBX8* %</b>	<b>Lumogen F Orange 240 %</b>	<b>Lumogen F Yellow 083 %</b>	<b>Lumogen F Red 305 %</b>	<b>Hostasol yellow 3G %</b>
<b>780/II/1</b>	<b>0.0075</b>	<b>1.0</b>	<b>0.05</b>			
<b>780/II/2</b>	<b>0.0075</b>	<b>1.0</b>		<b>0.05</b>		
<b>780/II/3</b>	<b>0.0075</b>	<b>1.0</b>			<b>0.05</b>	
<b>780/II/4</b>	<b>0.0075</b>	<b>1.0</b>				<b>0.05</b>
780/II/5		1.0	0.05			
780/II/6		1.0		0.05		
780/II/7		1.0			0.05	
780/II/8		1.0				0.05

\*Techpolymer SBX8 of Sekisui, Japan (cross-linked polystyrene)

**Table 3**

<b>Test No.</b>	<b>White pigment, titanium dioxide %</b>	<b>Scattering agent, polystyrene %</b>	<b>Lumogen F Orange 240 %</b>	<b>Lumogen F Yellow 083 %</b>	<b>Lumogen F Red 305 %</b>	<b>Hostasol yellow 3G %</b>
<b>780/III/1</b>	<b>0.0075</b>	<b>1.0</b>	<b>0.05</b>			
<b>780/III/2</b>	<b>0.0075</b>	<b>1.0</b>		<b>0.05</b>		
<b>780/III/3</b>	<b>0.0075</b>	<b>1.0</b>			<b>0.05</b>	
<b>780/III/4</b>	<b>0.0075</b>	<b>1.0</b>				<b>0.05</b>
780/III/5		1.0	0.05			
780/III/6		1.0		0.05		
780/III/7		1.0			0.05	



780/III/8		1.0				0.05
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White pigment	Scattering agent	Refractive index*
Titanium dioxide		2.70
	Barium sulfate	1.64
	SBX8	1.59
	Polystyrene	1.58

**\* from literature and manufacturers' data**

**Refractive index of the PMMA matrix = 1.5**

**Table 4**

**TiO<sub>2</sub> as white pigment and BaSO<sub>4</sub> as scattering agent**

Test No.	Hue	L*	a*	b*	Luminosity coefficient in %	Visual evaluation in D65 daylight
113T	Orange	57.67	18.84	58.39	25.6	orange-yellow fluorescing, somewhat cloudy
<b>144M</b>	<b>Orange</b>	<b>66.32</b>	<b>25.02</b>	<b>71.06</b>	<b>35.74</b>	<b>orange-yellow fluorescing, very brilliant</b>
113Q	Yellow	63.07	-27.02	58.38	31.67	yellow fluorescing, somewhat cloudy
<b>144K</b>	<b>Yellow</b>	<b>70.66</b>	<b>-27.17</b>	<b>69.43</b>	<b>41.69</b>	<b>yellow fluorescing, very brilliant</b>
113S	Red	40.66	47.18	29.89	11.65	red fluorescing, somewhat cloudy
<b>144G</b>	<b>Red</b>	<b>42.68</b>	<b>51.78</b>	<b>31.00</b>	<b>12.95</b>	<b>red fluorescing, very brilliant</b>
148A	Yellow	63.78	-25.19	62.60	32.53	yellow fluorescing, somewhat cloudy
<b>148F</b>	<b>Yellow</b>	<b>71.19</b>	<b>-24.83</b>	<b>73.80</b>	<b>42.46</b>	<b>yellow fluorescing, very brilliant</b>
780/I/1	Orange	63.97	18.19	68.98	32.77	orange-yellow fluorescing, somewhat cloudy
<b>780/I/2</b>	<b>Orange</b>	<b>66.65</b>	<b>22.12</b>	<b>72.21</b>	<b>36.17</b>	<b>orange-yellow fluorescing, brilliant</b>
<b>780/I/3</b>	<b>Orange</b>	<b>81.88</b>	<b>33.42</b>	<b>85.14</b>	<b>60.08</b>	<b>orange-yellow fluorescing, pale and brilliant</b>
780/I/4	Orange	86.01	34.81	86.86	68.01	orange-yellow fluorescing, very pale, not very brilliant
780/I/5	Yellow	67.00	-24.60	65.90	36.63	yellow fluorescing, somewhat cloudy
<b>780/I/6</b>	<b>Yellow</b>	<b>69.38</b>	<b>-25.09</b>	<b>70.14</b>	<b>39.88</b>	<b>yellow fluorescing, brilliant</b>
<b>780/I/7</b>	<b>Yellow</b>	<b>93.19</b>	<b>-26.04</b>	<b>104.07</b>	<b>83.41</b>	<b>yellow fluorescing, pale and brilliant</b>
780/I/8	Yellow	97.21	-25.48	108.88	92.95	yellow fluorescing, very pale, not very brilliant
780/I/9	Red	45.27	49.12	39.22	14.73	red fluorescing, somewhat cloudy
<b>780/I/10</b>	<b>Red</b>	<b>45.81</b>	<b>49.49</b>	<b>38.68</b>	<b>15.13</b>	<b>red fluorescing, brilliant</b>
<b>780/I/11</b>	<b>Red</b>	<b>57.49</b>	<b>64.60</b>	<b>41.16</b>	<b>25.43</b>	<b>red fluorescing, pale and</b>

						<b>brilliant</b>
780/I/12	Red	61.66	67.94	40.08	30.01	red fluorescing, very pale, not very brilliant
780/I/13	Yellow	68.55	-25.17	72.54	38.72	yellow fluorescing, somewhat cloudy
<b>780/I/14</b>	<b>Yellow</b>	<b>70.12</b>	<b>-25.58</b>	<b>75.30</b>	<b>40.91</b>	<b>yellow fluorescing, brilliant</b>
<b>780/I/15</b>	<b>Yellow</b>	<b>95.38</b>	<b>-26.10</b>	<b>106.93</b>	<b>88.52</b>	<b>yellow fluorescing, pale and brilliant</b>
780/I/16	Yellow	99.37	-25.31	108.38	98.37	yellow fluorescing, very pale, not very brilliant

**Table 5**

**TiO<sub>2</sub> as white pigment and SBX8 beads as scattering agent**

<b>Test No.</b>	<b>Hue</b>	<b>L*</b>	<b>a*</b>	<b>b*</b>	<b>Luminosity coefficient in %</b>	<b>Visual evaluation in D65 daylight</b>
780/II/1	Orange	68.46	22.57	73.88	38.60	orange-yellow fluorescing, very brilliant
780/II/2	Yellow	75.62	-26.17	79.67	49.27	yellow fluorescing, very brilliant
780/II/3	Red	49.04	54.99	41.13	17.63	red fluorescing, very brilliant
780/II/4	Yellow	83.72	-27.56	95.57	63.54	yellow fluorescing, very brilliant
780/II/5	Orange	63.52	16.57	68.21	32.22	orange-yellow fluorescing, somewhat cloudy
780/II/6	Yellow	69.02	-25.67	69.33	39.37	yellow fluorescing, somewhat cloudy
780/II/7	Red	45.27	48.55	38.37	14.73	red fluorescing, somewhat cloudy
780/II/8	Yellow	69.35	-26.82	73.00	39.83	yellow fluorescing, somewhat cloudy

**Table 6**

**TiO<sub>2</sub> as white pigment and polystyrene as scattering agent**

<b>Test No. (poly-styrene)</b>	<b>Hue</b>	<b>L*</b>	<b>a*</b>	<b>b*</b>	<b>Luminosity coefficient in %</b>	<b>Visual evaluation in D65 daylight</b>
780/III/1	Orange	61.84	15.37	63.75	30.22	orange-yellow fluorescing, very brilliant
780/III/2	Yellow	68.14	-25.72	67.35	38.16	yellow fluorescing, very

						<b>brilliant</b>
<b>780/III/3</b>	<b>Red</b>	<b>46.26</b>	<b>49.91</b>	<b>37.77</b>	<b>15.46</b>	<b>red fluorescing, very brilliant</b>
<b>780/III/4</b>	<b>Yellow</b>	<b>68.49</b>	<b>-26.95</b>	<b>71.44</b>	<b>38.65</b>	<b>yellow fluorescing, very brilliant</b>
780/III/5	Orange	52.77	-2.26	51.01	20.84	orange-yellow fluorescing, somewhat cloudy
780/III/6	Yellow	50.62	-22.43	39.85	18.95	yellow fluorescing, somewhat cloudy
780/III/7	Red	41.95	41.86	33.48	12.47	red fluorescing, somewhat cloudy
780/III/8	Yellow	51.77	-21.92	44.60	19.94	yellow fluorescing, somewhat cloudy

The new examples show that superior properties are obtained when the whitening pigment is used in the claimed amount of 0.001 to 0.1 % by weight.

Below 0.001 % by weight (for example at 0.0005 % by weight) the coloring is too dim. Above the upper limit of 0.1 % by weight (for example at 0.15 % by weight) the coloring is too bright (high L values) which takes away the brilliance.

Close to the upper and lower limits ( for example at 0.0015 and 0.075 %) as well as almost in the middle of the range (0.0075 %) good results are detected throughout.

Beyond the values themselves, the optical evaluation with the human eye under day light conditions (D65) is also important.

Examples with SBX8 light scattering pearls made of cross linked polystyrene and with (not cross linked) polystyrene are presented in addition to BaSO<sub>4</sub> as light scattering agent. Notably, as seen in Tables 4, 5 and 6, the examples according to the present invention (**shown in bold**) exhibit superior L\*, a\*, and b\* values, Luminosity coefficient and Visual evaluation in D65 daylight compared to the respective comparative examples.

JP6-67612A (corresponds to EP 0 559 083 A2) fails to disclose or suggest the **combinations** of a fluorescent dye, the claimed scattering agent and a white pigment in a

polymer matrix and the superior results shown in the examples of the present specification.

In the present invention, **very small amounts of 0.001 to 0.1 % by weight of white pigment give marked increase in color brightness**. This is not disclosed or suggested in JP6-67612A.

JP6-67612A does not recognize that very small amounts of 0.001 to 0.1 % by weight of white pigment give superior results. **JP6-67612A thinks that all amounts between 0.01 to 10% by weight (paragraph [0017]) give the same result**. However, the Examples in the **Rule 132 Declaration** show that superior properties are obtained when the whitening pigment is used in the claimed amount of 0.001 to 0.1 % by weight.

**Below 0.001 % by weight** (for example at 0.0005 % by weight) the colouring is too dim. **Above the upper limit of 0.1 % by weight** (for example at 0.15 % by weight) the colouring is too bright (high L values) which takes away the brilliance.

**Close to the upper and lower limits** ( for example at 0.0015 and 0.075 %) as well as almost in the middle of the range (0.0075 %) good results are detected throughout.

As discussed above, beyond the values themselves, the optical evaluation with the human eye under day light conditions (D65) is also important.

The Examiner argues in the Office Action of March 24, 2008, that the Declaration filed January 23, 2008, is insufficient to overcome the rejection over JP 06-67612A because “the statement on in section 5 that applicants know of no reason why other examples within the scope of claim 1 should not also show the same superior results indicates that the shown superior results when the amount of white pigment is within the claimed range are not unexpected.” See page 4, 1<sup>st</sup> paragraph of the Office Action of March 24, 2008.

Apparently the Examiner has misinterpreted the sentence at page 7 of the Declaration which states that “applicants know of no reason why other examples within the scope of

Claim 1 of the present invention should not show the same superior results". She thinks that based on this statement, the results are not unexpected. However, the comparison is not between different examples in the claimed range but with Examples outside the claimed range (for example 0.0005 and 0.15 wt.% of the whitening pigment). **Below 0.001 % by weight** (for example at 0.0005 % by weight) the colouring is too dim. **Above the upper limit of 0.1 % by weight** (for example at 0.15 % by weight) the colouring is too bright (high L values) which takes away the brilliance. However, within the claimed range, **very small amounts of 0.001 to 0.1 % by weight of white pigment give marked increase in color brightness**. This is not disclosed or suggested in JP 06-67612A.

Further, in JP 06-67612A, the amount of white pigment, for example  $\text{TiO}_2$ , is not greater than 0 wt% to less than 10 wt% as stated by the Examiner at page 3, 3<sup>rd</sup> full paragraph of the Office Action of March 24, 2008. The amount of white pigment in JP 06-67612A is 0.01 – 10 wt% and preferably 0.1 to 5 wt% (see also the Canadian equivalent of JP 06-67612A, CA2091110A1, page 5, lines 1 - 3, filed by IDS herewith). Thus, JP 06-67612A teaches away from using 0.001 to 0.1% by weight of a **white pigment** as claimed in Claim 1 of the present invention.

The dependent claims are separately patentable.

Claim 2:

Claim 2 is separately patentable because JP 06-67612A fails to disclose or suggest that in the moulding according to Claim 1, the white pigment is titanium dioxide, zinc oxide or zinc sulphide.

Claim 4:

Claim 4 is separately patentable because JP 06-67612A fails to disclose or suggest that in the moulding according to Claim 1, the reflectance of said moulding is higher by at least 10% than that of a corresponding moulding without white pigment.

Claim 5:

Claim 5 is separately patentable because JP 06-67612A fails to disclose or suggest that in the moulding according to Claim 1, the transparent plastic has a transmittance of at least 40% in the visible region.

Claim 6:

Claim 6 is separately patentable because JP 06-67612A fails to disclose or suggest that in the moulding according to Claim 1, the said transparent plastic is selected from the group consisting of extruded polymethyl methacrylate, cast polymethyl methacrylate, impact-modified polymethyl methacrylate, polycarbonate, polystyrene, styrene-acrylonitrile, polyethylene terephthalate, glycol-modified polyethylene terephthalate, polyvinyl chloride, transparent polyolefin, acrylonitrile-butadiene-styrene and mixtures thereof.

Claim 7:

Claim 7 is separately patentable because JP 06-67612A fails to disclose or suggest that in the moulding according to Claim 1, the fluorescent dye is present in combination with other colorants.

Claim 11:

Claim 11 is separately patentable because JP 06-67612A fails to disclose or suggest an article, comprising: the moulding as claimed in Claim 1, wherein said article is a vehicle bodywork, a designer furniture, signage, a lighting system, or one or more parts thereof.

Claim 13:

Claim 13 is separately patentable because JP 06-67612A fails to disclose or suggest that in the moulding according to Claim 1, the white pigment is present in an amount of from 0.001 to 0.0075% by weight.

Claim 14:

Claim 14 is separately patentable because JP 06-67612A fails to disclose or suggest that in the moulding according to Claim 1, the white pigment is present in an amount of from 0.001 to 0.01% by weight.

Claim 15:

Claim 15 is separately patentable because JP 06-67612A fails to disclose or suggest that in the moulding according to Claim 1, the fluorescent dye is combined with another colorant in an amount of from 0.001 to 1 % by weight.

Claim 16:

Claim 16 is separately patentable because JP 06-67612A fails to disclose or suggest that in the moulding according to Claim 1, the scattering agent is one or more materials selected from the group consisting of polystyrene, light-scattering beads comprising crosslinked plastic, mixtures of barium sulphate and polystyrene, mixtures of barium sulphate



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and light-scattering beads comprising crosslinked plastic, and mixtures thereof. Notably, JP 06-67612A only discloses barium sulphate as a white pigment, see paragraph [0018].

Thus, Claims 1, 4-7, 11, 13-14 are Not Obvious over JP 06-67612 within the meaning of 35 U.S.C. §103(a). For all the above reasons, it is respectfully requested that this rejection be REVERSED.

**In addition, the Examiner is requested to consider the List of Related Cases/IDS filed herewith.**

This application presents allowable subject matter, and the Examiner is kindly requested to pass it to issue. Should the Examiner have any questions regarding the claims or otherwise wish to discuss this case, he is kindly invited to contact Applicants' below-signed representative, who would be happy to provide any assistance deemed necessary in speeding this application to allowance.

Respectfully submitted,

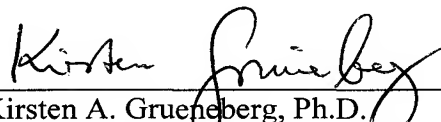
OBLON, SPIVAK, McCLELLAND,  
MAIER & NEUSTADT, P.C.  
Norman F. Oblon

Customer Number

**22850**

Tel: (703) 413-3000  
Fax: (703) 413 -2220  
(OSMMN 06/04)

NFO:KAG\la

  
Kirsten A. Grueneberg, Ph.D.  
Registration No.: 47,297